DEVELOPMENT OF NOVEL HIGHLY PRODUCTIVE TRACK ETCH MEMBRANES FOR FORWARD OSMOSIS PROCESS

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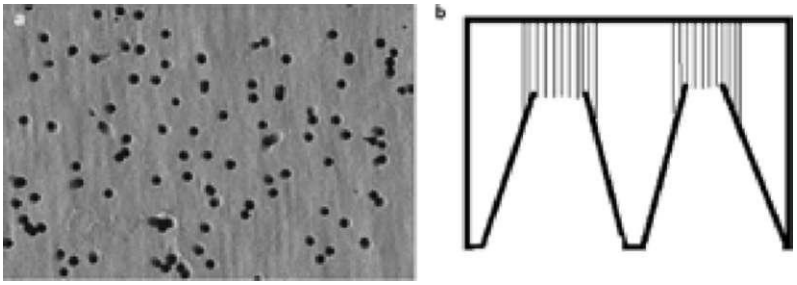
Introduction. Forward osmosis (FO) process has gained vast popularity in recent years. FO has the potential advantages of low energy demand, insignificant membrane fouling, and as result rare membrane cleaning is required [1]. Despite that nowadays different research groups from around the world [2] working on development of highly productive membranes for direct osmosis process, water flux of FO membranes is far away from water flux of reverse osmosis membranes. With reference to that it can be claimed that development of the new generation of forward osmosis membrane is of high importance.

Materials and Methods. The track-etch technique is used for the membrane fabrication. The method is based on irradiation of thin polymer film with high-energy ions (by DC-60 heavy ion accelerator) and subsequent physical and chemical treatment (etching) of the irradiated film. During irradiation by swift ions, latent ion tracks are formed along the path of the ions. After irradiation the material is subjected to the etching for the latent ion tracks removal.



Results and Discussion. The membrane with the following parameters will be obtained: high hydrophilicity (contact angle of 25°), low thickness (12 |xm), high porosity and low tortuosity of the porous side (Figure 1). Accordingly to [3] it should benefit productivity of FO process.

Conclusions. The research has the potential to facilitate industrial applications of FO technology and reclaim water with lower production cost. It will provide strategic benefits for Kazakhstan by meeting the national goals in sustainability through water reclamation. Since water shortage is worldwide problem, it is believed that the project will benefit not only Kazakhstan needs, but will solve global problem of clean water demand.

References.

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